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PTO/SB/05 (12/97)

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**UTILITY  
PATENT APPLICATION  
TRANSMITTAL**

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.

TI-28458

First Named Inventor or Application Identifier

Ryan Middleton, et al.

Title

System for Nonlinear Viewing of Television Show Segments

Express Mail Label No.

EL547739861US

**APPLICATION ELEMENTS**

See MPEP Chapter 600 concerning utility patent application contents

**ADDRESS TO:**Assistant Commissioner for Patents  
Box Patent Application  
Washington, DC 202311. ☒ \*Fee Transmittal Form (e.g., PTO/SB/17)  
(Submit an original, and a duplicate for fee processing)6. ☐ Microfiche Computer Program (Appendix)2. ☒ Specification [Total Pages **9**]  
(preferred arrangement set forth below)7. ☐ Nucleotide and/or Amino Acid Sequence Submission  
(if applicable, all necessary)

- Descriptive title of the Invention
- Cross References to Related Applications
- Statement Regarding Fed sponsored R&D
- Reference to Microfiche Appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

a. ☐ Computer Readable Copyb. ☐ Paper Copy (identical to computer copy)c. ☐ Statement verifying identical of above copies3. ☒ Drawing(s) (35 USC d113) [Total Sheets **2**]4. ☐ Oath or Declaration [Total Pages **1**]a. ☒ Newly Executed (original or copy)b. ☐ Copy from a prior application (37 CFR §1.63(d))  
(for continuation/divisional with Box 17 completed)**[Note Box 5 below]**i. ☐ **DELETION OF INVENTOR(S)**  
Signed statement attached deleting inventor(s)  
named in the prior application,  
see 37 CFR §1.63(d)(2) and 1.33(b)5. ☐ Incorporation By Reference (useable if Box 4b is checked)  
The entire disclosure of the prior application, from which a copy of  
the oath or declaration is supplied under Box 4b, is considered as  
being part of the disclosure of the accompanying application and is  
hereby incorporated by reference therein.**ACCOMPANYING APPLICATION PARTS**8. ☒ Assignment Papers (cover sheet & Documents(s))9. ☐ 37 CFR §3.73(b) Statement (when there is an assignee) ☒ Power of Attorney10. ☐ English Translation Document (if applicable)11. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations12. ☒ Preliminary Amendment13. ☒ Return Receipt Postcard (MPEP 503)  
(Should be specifically itemized)14. ☐ \*Small Entity Statement(s) ☐ Statement filed in prior application  
(PTO/SB/09-12) Status still proper and desired15. ☐ Certified Copy of Priority Document(s)  
(if foreign priority is claimed)16. ☐ Other:

\*A new statement is required to be entitled to pay small entity fees, except where one has been filed in a prior application and is being relied upon.

17. If a **CONTINUING APPLICATION**, check appropriate box and supply the requisite information below and in a preliminary amendment:☐ Continuation☐ Divisional☐ Continuation-in-part (CIP)

of prior application No:

Prior application information: Examiner \_\_\_\_\_

Group / Art Unit: \_\_\_\_\_

**18. CORRESPONDENCE ADDRESS**

Customer Number or Bar Code Label

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Correspondence address below

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Name (Print/Type)

Robert L. Troike

Registration No. (Attorney/Agent)

24,183

Signature

Robert L. Troike

Date

8/14/00

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Patent fees are subject to annual revision on October 1.

These are the fees effective October 1, 1997

Small Entity payments must be supported by a small entity statement, otherwise large entity fees must be paid. See Forms PTO/SB/09-12  
Express Mailing Label No.: EL547739861US**Complete If Known**

Application Number	TBD
Filing Date	Herewith
First Named Inventor	Ryan Middleton, et al.
Examiner Name	TBD
Group / Art Unit	TBD
Attorney Docket No.	TI-28458

TOTAL AMOUNT OF PAYMENT (\$)**690.00****METHOD OF PAYMENT**1. ☒ The Commissioner is hereby authorized to charge to the following Deposit Account,

Deposit Account Number

20-0668

Deposit Account Name

Texas Instruments Incorporated

☒ Charge any additional fee required or credit any overpayment
 ☐ Charge all indicated fees and any additional fee required or credit any overpayment
2. ☐ **Payment Enclosed:**
☐ Check
 ☐ Money Order
 ☐ Other
**FEE CALCULATION****1. BASIC FILING FEE**

Large Fee Code	Entity Fee (\$)	Small Fee Code	Entity Fee (\$)	Fee Description	Fee Paid
101	690	201	395	Utility filing fee	\$690
106	310	206	165	Design filing fee	\$
107	480	207	270	Plant filing fee	\$
108	760	208	395	Reissue filing fee	\$
114	150	214	75	Provisional filing fee	\$

SUBTOTAL (1) (\$)**690****2. EXTRA CLAIM FEES**

	Extra Claims	Fee from below	Fee Paid
Total Claims	11 - 20** = 0	18	0
Independent Claims	1 - 3** = 0	78	0
Multiple Dependent		260	

\*\*or number previously paid, if greater; For Reissue, see below

Large Fee Code	Entity Fee (\$)	Small Fee Code	Entity Fee (\$)	Fee Description
103	18	203	11	Claims in excess of 20
102	78	202	41	Independent Claims in excess of 3
104	260	204	135	Multiple dependent claims in excess of 3
109	78	209	41	**Reissue independent claims over original patent
110	18	210	11	**Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$)**0****FEE CALCULATION (continued)****3. ADDITIONAL FEES**

Large Fee Code	Entity Fee (\$)	Small Fee Code	Entity Fee (\$)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet.	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	380	216	200	Extension of time within second month	
117	870	217	475	Extension of time within third month	
118	1,360	218	755	Extension of time within fourth month	
128	1,850	228	1,030	Extension of time within fifth month	
119	300	219	155	Notice of Appeal	
120	300	220	155	Filing a brief in support of an appeal	
121	260	221	135	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,210	241	660	Petition to revive - unintentional	
142	1,210	242	660	Utility issue fee (or reissue)	
143	430	243	225	Design issue fee	
144	580	244	335	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	240	126	240	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per properly (time number of properties)	
146	760	246	395	Filing a submission after final rejection (37 CFR 1.129(a))	
149	760	249	395	For each additional invention to be examined (37 CFR 1.129(b))	

Other fee (specify) \_\_\_\_\_

Other fee (specify) \_\_\_\_\_

\*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) **0****SUBMITTED BY**

Typed or Printed Name

Robert L. Troike

Signature

*Robert L. Troike*Date  
8/14/00

Complete (if applicable)

Reg. Number

24,183

Deposit Account User ID

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Ryan Middleton, et al.

Serial No.: TBD

Filed: Herewith

For: System for Nonlinear Viewing of Television Show Segments

TI-28458

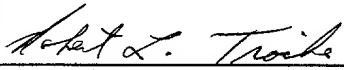
Examiner: TBD

Art Unit: TBD



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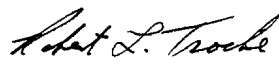
 8/14/00  
Robert L. Troike, Reg. No. 24,183 Date

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Enclosed are **TWO (2)** sheets of formal drawings for the above-referenced case. Please charge any necessary fees to Deposit Account No. 20-0668 of Texas Instruments Incorporated. This sheet is enclosed in triplicate.

Respectfully submitted,

  
Robert L. Troike  
Attorney for Applicants  
Reg. No. 24,183

Texas Instruments Incorporated  
P.O. Box 655474, M/S 3999  
Dallas, TX 75265  
(202) 639-7710

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

TI-28458

Ryan Middleton, et al.

Examiner: TBD

Serial No: TBD

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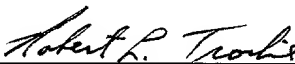
PRELIMINARY AMENDMENT

Assistant Commissioner for Patents

Washington, D. C. 20231

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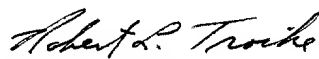
 8-14-00  
Robert L. Troike, Reg. No. 24,183 Date

This application claims priority under 35 USC 119 (e)(1) of provisional application number 60/154,956, filed 09/21/99.

Prior to the examination of the above-identified application, please amend the specification by inserting before the first line the sentence:

--This application claims priority under 35 USC § 119(e)(1) of provisional application number 60/154,956, filed 09/21/99.--

Respectfully submitted,

  
Robert L. Troike  
Attorney for Applicants  
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## SYSTEM FOR NONLINEAR VIEWING OF TELEVISION SHOW SEGMENTS

### Field of Invention

10           This invention relates to television systems, and more particularly to a television system for nonlinear viewing of television show segments.

### Background of Invention

15           Television viewing today is linear viewing of transmitted programs. The viewer tunes to a particular channel and the program material, including advertisements, are displayed or recorded (if the viewer has a video tape recorder) in sequence. Television broadcasting includes extensive editing of program material, particularly news broadcasting to fit the programming time constraints so a lot of good material is edited out. It would be highly desirable to enable a viewer to see this material. Video On Demand (VOD) systems require significant dedicated bandwidth and server resources to send selected segments. Receiver storing of high amounts of television and other media content requires huge storage requirements on receiver.

20           Broadcasters are faced with the high cost of installing High Definition Television Broadcasting Equipment with an unknown number of customers willing to pay the cost for High Definition television sets. It is, therefore, desirable to provide other ways of attracting more viewers.

### Summary of Invention:

25           In accordance with one embodiment of the present invention, a system for selective segment reception of broadcast television and/or caching television content is provided wherein while at a given television channel frequency, a main signal is provided and separate television ancillary data, including television show segment, is provided and the receiver system can either store or provide the ancillary data out of the television receiver to the television display.

### **In the Drawings:**

FIG. 1 is a block diagram of the system according to one embodiment of the present invention;

FIG. 2 is a block diagram of the system according to a second embodiment of the present invention;

FIG. 3 illustrates transmission in the sidebands according to a second embodiment of the present invention; and

FIG. 4 illustrates switching between high resolution to standard resolution screens at the same time to provide ancillary data.

FIG. 5 illustrates full high definition TV bandwidth and alternate 188 Byte bandwidth, and

FIG. 6 illustrates another embodiment of the present invention using multiplexed channels.

### **Detailed Description:**

Referring to FIG. 1, the primary television signals from source 11 are modulated at modulator 13 and amplified and broadcasted via transmitter 15 and antenna or cable system 17. An alternate signal source 19, which may be signals including a television video show segment, are modulated at modulator 13 during, for example, the vertical blanking interval (VBI). The signals sent during the vertical blanking interval also includes data to transmit command/control signals for caching the small video segments of content from the auxiliary channel 19 in cache 26, which can include VBI or user data as well as subchannels to the main channel. The VBI signals direct the updating of the cached television content, just keeping in store what is associated with the main television show in a time window. New signals received at receiver 20 via antenna 17a or cable system 17 replace that stored in an earlier time window to clean up the cache 26 and to keep the storage requirement small. At the receiver end, the antenna 17b or cable system and tuner 21 receive the transmitted signals and the main channel signals are sent to demodulator 23 and decoder 25 to the television set with display 27. The command and/or control signals for caching control and the ancillary segment signals are provided out of demodulator 23 and decoder 25 to control 29 and the ancillary channel segment when decoded is selectively stored on disk or other memory cache 26. New signals coming in through

demodulator 23 can, in one embodiment, clean-up the cache to keep the storage requirement small. The command/control signals at control 29 control the storage on cache 26. The receiver system via the control 29 can provide a television viewer interface option wherein small icons are generated at a generator 28 that appear on the television display screen 27 overlaid on top of the television show, showing the ancillary television content selectable by the viewer. This can be controlled by the command/control signals at control 29 to store in cache 26 and to generate the icons for the television set. The generator 28 generates the icon when the ancillary content is demodulated and stored in the cache 26. These are removed as content leaves the cache. The viewer has an interactive terminal 27a such as a mouse or keyboard on the television remote to select the icon and access the cache to the screen. The primary source and ancillary sources may encode at an encoder to convert to binary data to be modulated and the decoder 25 converts the signal back to analog signals. One example of the ancillary data is caching simultaneous camera views of a sports event, so the viewer can direct instant replay from a different angle. Another example is caching smaller videos directly related to the main show that are directly coupled in a time neighborhood with the show, *e.g.*, Teletubies can have user-profile-based video content.

The present invention in one embodiment utilizes the Vertical Blanking Interval (VBI) to manage the content of the cache of media on the receiver, keeping the cache aligned with the content of the channel being received at the time. When the VBI occurs, the data from the ancillary source is stored with the control by the command/control signals.

The ATVEF ([www.atvef.com](http://www.atvef.com)) specification provides Internet/VBI protocols that will support the implementation; in particular:

- announcements over Session Description Protocol(SDP)
- triggers over User Datagram Protocol(UDP)

can be utilized to transmit the control information for cache management.

In accordance with another embodiment of the present invention as illustrated in FIG. 2, the main television signal at source 111 is modulated at modulator 113 with a television channel A, for example, and transmitted by transmitter 115 via antenna 117a or cable system 117. The ancillary data at source 119 is modulated at modulator 113a to a digital data sideband carrier signal. Analog signals require sideband isolation between channels since the spectrum from one channel frequency band spills into the adjacent channel frequency bands. When the main channels are sent under data compression such as MPEG1 and MPEG2, they do not require

isolation. The main primary source 111 is modulated using a data compressed modulation at modulator 113 such as MPEG1. The ancillary source 19 data and command/control signals are sent between the data compressed MPEG channels, such as between channel A and B, in accordance with this other embodiment. As illustrated in FIG. 3, between the 6 mHz channels A, B and C are sideband channels S.B.A. and S.B.B. normally kept for isolation. The sideband channel carries the ancillary data and command/controls while the primary source is sent using compressed digital data with low spill over. Similar sideband communication system is provided by U.S.A. Digital Radio for radio as described, for example, in Hunsinger et.al. U.S. Patent No. 5,745,525. This patent is incorporated herein by reference. The receiver 120 receives the main signal at the channel A carrier and provides the main signal through the tuner 121 to the demodulator 123 and decoder 125 to the television set 127. The sideband channel SBA is coupled out of port 2 to demodulator 124. At decoder 129 are detected the command and control signals that are used to store the ancillary signal at cache storage 126 under control of controller 129. Controller 136 controls the sideband signals stored in cache storage 126 and input into the television set 127. An icon generator 128 is responsive to the storage of the selected sideband channel in cache 126 to provide an icon on the display screen of television set 127 for selection by selection control 127a to select the stored cache signal sent on the sideband channel in place of the main signal. The decoder 125 also converts when applicable digital signals to an analog for the television set 127.

In accordance with another embodiment as shown in FIG. 4, one high definition television channel can be split by a control 101 into two channels (source #1 and source #2) with each carrying, for example, half high definition television information. The modulator 103 receives two adjacent standard carrier frequency signals or one high definition carrier signal for modulation and transmitter 105 transmits over either the high definition channel frequency band or two adjacent lower or standard frequency bands. High definition signals from source #1 can be switched at switch S so source #1 is switched to reduce the bandwidth, for example, in half and also add an adjacent channel source #2 at adjacent frequency band and command/controls at reduced bandwidth within the high definition band. At the receiver 108, the tuner 109 is switched to the two channel modes such that the demodulator 110 converts the half band signals and provides source #1, for example, to the TV receiver 112 through decoder 111. The ancillary channel (source #2 for the example) and command/control is provided at port 2 to demodulator



114. The decoders convert digital signals to analog and decoder 115 detects and provides the necessary command/control signals and includes the controller. The controller provides the control signals to perform the storage and erase functions (memory control) and signal to icon generator 118. The interactive user selects the ancillary programs by selector 112a. The output is either stored in cache 116 or switched to TV 112. During program content such as news, two programs can be sent over the single high definition channel with each 188 Bytes with a first set of 188 Bytes sending, for example, the main program (for example, source #1) and the second set of 188 Bytes sending the ancillary data of, for example, more detail about a segment of the news program. For example, when a main program leaves a segment on Kosovo and goes on to discuss the weather and the viewer wants more information on Kosovo, the viewer can select to receive an ancillary program on Kosovo or store the ancillary program segment on Kosovo in the cache disk 116.

Referring to FIG. 5, the standard resolution digital broadcast for television is 188 Bytes and fits in the bandwidth of half the high resolution television bandwidth. The system can select to transmit, for example, full high resolution program material for sports events, for example, but switch to lower resolution for selected segments of news broadcasts so viewer can select ancillary data such as more on Kosovo or alternate views of a replay of the sports event. The alternate 188 Bytes is represented by selections 1 and 2 and selection 3 represents the high definition broadcast.

In accordance with another embodiment of the present invention as illustrated in FIG. 6 a television channel is split into several subchannels of time multiplexed signals. The main subchannel can be viewed with subchannels cached in the system. Control data embedded in the main subchannel provides commands for updating (removing old subchannel segments and storing new ones). The cached subchannels may be selected by the viewer to see additional video associated with the main subchannel, such as a different perspective of a football game. Referring to FIG. 6, the n sources are time multiplexed at multiplexer 51 with source 1 (main channel) on most of the time and only short segments provided the other sources. The signals are modulated at modulator 55 and transmitted via transmitter 51 and antenna or cable 59. The received signal at antenna or cable end 60 is demodulated at demodulator 61 and applied to demultiplexer 63. The main signal from source 1 is provided to the television set 67 via channel 65 and the separate time spaced channels are stored in separate cache memories on disk 69 or on

separate RAM memories. The storage of the signals from the sources 2 through n at the separate cache memories is indicated by the generation of icons at generator 68. The command/control is provided from the main channel signals to controller 70 that controls the storage, icon generation and access. When the viewer selects a stored segment by a keyboard entry or mouse click on the  
5 icon, the controller 709 fetches the proper cache location. The cache stores only the most recent data information and overwrites the old.

The command and control signals in the embodiment can be sent in the main channel or any other channel.

IN THE CLAIMS:

1. A system for nonlinear viewing of television segments comprising:

a television broadcast transmitter including means for generating and transmitting main  
5 television signals and separate ancillary television signals said related to said main signals;

a television receiver system for receiving said main signals and for storing in a cache  
memory the ancillary signals, and

selective means at the television receiver for providing either the main signals or the  
ancillary signals to the television display.

2. The system of Claim 1 including means for generating an icon on a television  
receiver display indicating the presence of the stored ancillary signals and means at the television  
receiver for accessing said stored ancillary signal in said cache memory using said icon.

3. The system of Claim 1 wherein said ancillary signal is broadcasted in the vertical  
blanking interval of the main signal and said receiver receives the ancillary signal during the  
vertical blanking interval.

4. The system of claim 1 wherein said television signals are transmitted over a  
20 digital television channel subdivided into several subchannels of multiplexed signals and  
wherein one of said subchannels contains said main television signals and the other subchannels  
provide the ancillary signals.

5. The system of Claim 4 wherein said main subchannel carries the control data for  
25 commands for updating by removing old subchannel segments and storing new ones.

6. The system of Claim 1 wherein said separate ancillary signal contains short  
television signal segments related to the main signals and said cache stores said segments and  
said main signals and contains control data providing means for removing and storing said  
30 segments and said receiver system includes means for responsive to said control data for storing  
and removing said short segments from said cache memory.

7. The system of Claim 1 wherein said ancillary signals include ancillary data and command and control signals.

5 8. The system of Claim 7 wherein said main signals are data compressed signals and the ancillary signals are in the sideband channels between said main signals.

9. The system of Claim 1 wherein said main signals are data compressed segments and the ancillary signals are in the sidebands between said main signals.

10 10. The system of Claim 1 wherein said main signals and ancillary signals are different parts of a high definition television channel.

11. The system of Claim 10 including means for switching between high definition  
15 television channel and one standard television subchannel and an ancillary subchannel.

## SYSTEM FOR NONLINEAR VIEWING OF TELEVISION SHOW SEGMENTS

### 5      Abstract of the Disclosure

A system for nonlinear viewing of television show segments is provided by transmitting a main signal and an ancillary signal. The ancillary signal is a short show segment. The television receiver system can select either the main signal or the ancillary signal. The ancillary signal is stored in a small cache memory for later access in place of the main signal.

- 10    An icon is generated on the television set to notify the user of the presence of the ancillary signal.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Ryan Middleton, et al.

Serial No.: TBD

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For: System for Nonlinear Viewing of Television Show Segments

TI-28458

Examiner: TBD

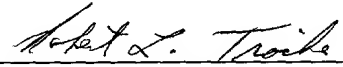
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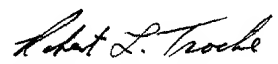
 8/14/00  
Robert L. Troike, Reg. No. 24,183 Date

Sir:

Enclosed are **TWO (2)** sheets of formal drawings for the above-referenced case. Please charge any necessary fees to Deposit Account No. 20-0668 of Texas Instruments Incorporated.

This sheet is enclosed in triplicate.

Respectfully submitted,

  
Robert L. Troike  
Attorney for Applicants  
Reg. No. 24,183

Texas Instruments Incorporated  
P.O. Box 655474, M/S 3999  
Dallas, TX 75265  
(202) 639-7710

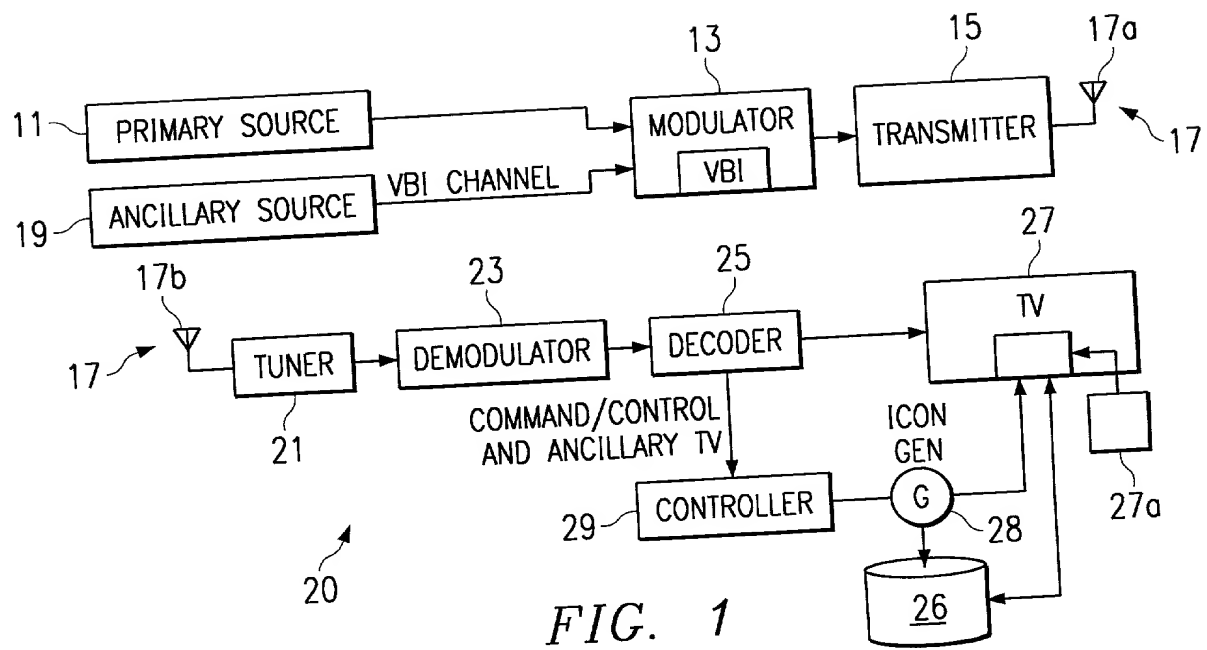


FIG. 1

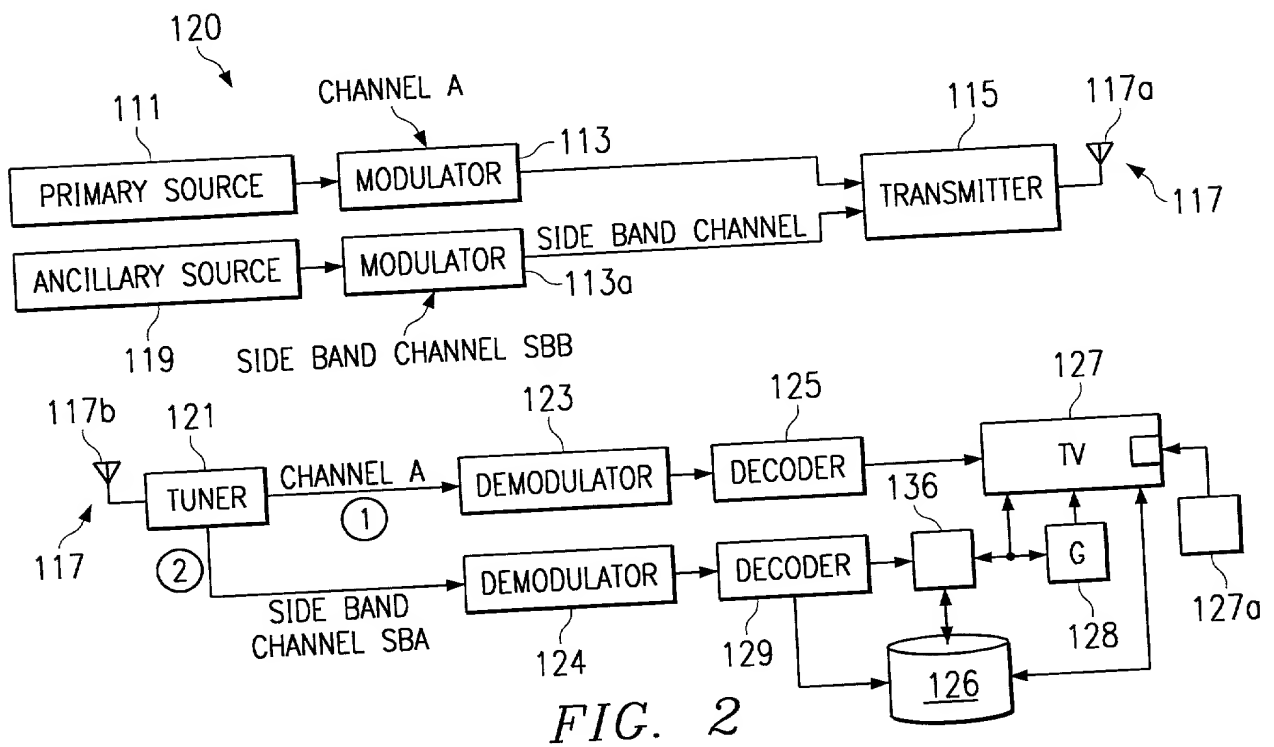


FIG. 2

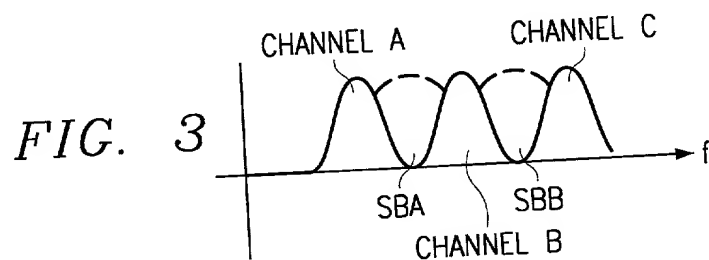


FIG. 3

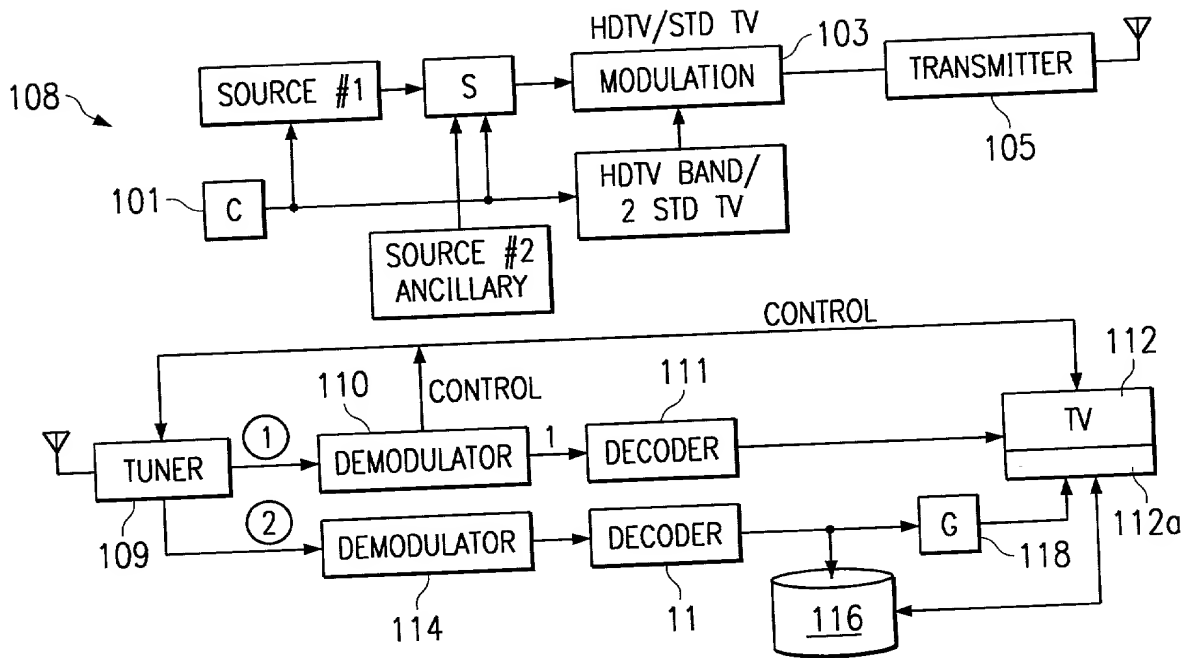


FIG. 4

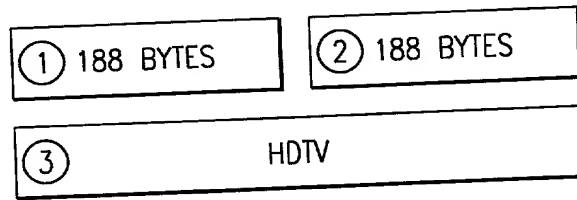


FIG. 5

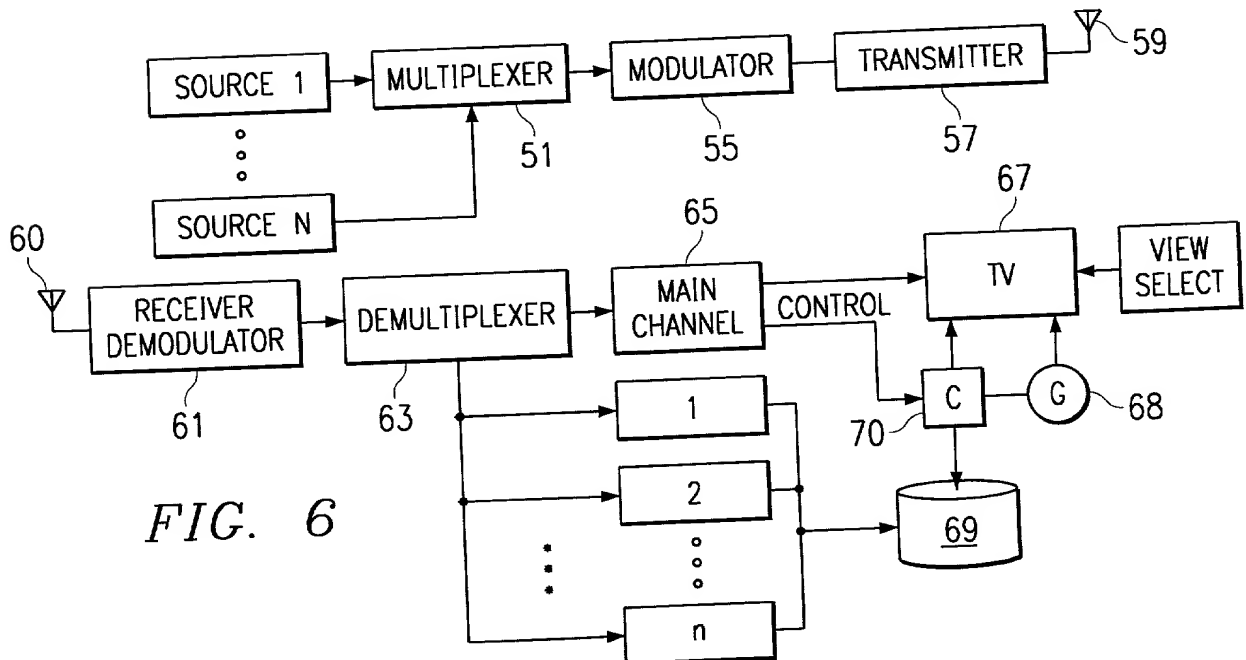



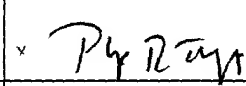

FIG. 6



**APPLICATION FOR UNITED STATES PATENT**  
**DECLARATION AND POWER OF ATTORNEY**

As a below named inventor, I declare that my residence, post office address and citizenship are as stated below next to my name; that I verily believe that I am the original, first and sole inventor if only one name is listed below, or an original, first and joint inventor if plural inventors are named below, of the subject matter which is claimed and for which a patent is sought on the invention entitled as set forth below, and the title as set forth below which is described in the attached specification; that I have reviewed and understand the contents of the specification, including the claims, as amended by any amendment specifically referred to in the oath or declaration; that no application for patent or inventor's certificate on this invention has been filed by me or my legal representatives or assigns in any country foreign to the United States of America prior to the filing date of said application; and that I acknowledge my duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, section 1.56;

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

TITLE OF INVENTION:		
System for Nonlinear Viewing of Television Show Segments		
POWER OF ATTORNEY: I HEREBY APPOINT THE FOLLOWING ATTORNEYS TO PROSECUTE THIS APPLICATION AND TRANSACT ALL BUSINESS IN THE PATENT AND TRADEMARK OFFICE CONNECTED THEREWITH		
Robert L. Troike, #24,183; Richard L. Donaldson, #25,673; Jay M. Cantor, #19,906; Lawrence J. Bassuk, #29,043; William B. Kempler, Reg. No. 28,228; Carlton H. Hoel, #29,934; Wade James Brady, III. #32,080		
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NAME OF INVENTOR: (1)	NAME OF INVENTOR: (2)	NAME OF INVENTOR: (3)
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COUNTRY OF CITIZENSHIP: United States	COUNTRY OF CITIZENSHIP: United States	COUNTRY OF CITIZENSHIP:
SIGNATURE OF INVENTOR: x 	SIGNATURE OF INVENTOR: x 	SIGNATURE OF INVENTOR: 
DATE: x Feb 10 2000	DATE: x Feb 10 2000	DATE: Feb 10 2000